CubeSat Autonomous Rendezvous & Docking Software (CARDS)

Completed Technology Project (2013 - 2016)

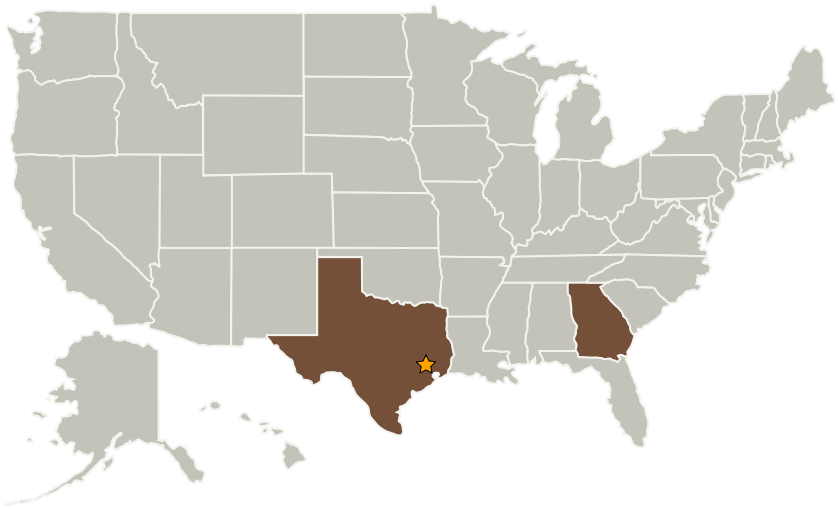
Project Introduction

This task creates spacecraft mission manager software to autonomously (i.e., without direct human operator intervention) maneuver a CubeSat's orientation and position relative to another vehicle in a proximity rendezvous and docking scenario from an initial distance of 1 km to a close in distance of 1 m. The algorithms are tailored for the unique resource and actuation limitations of a CubeSat operating in low Earth orbit. The software will be demonstrated in real-time in the lab using an embedded microprocessor system that has CubeSat flight heritage.

Anticipated Benefits

This technology will enable small satellites including CubeSats to perform coordinated maneuvers in close proximity (<1 km) with other satellites.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Georgia Institute of Technology-Main Campus(GA Tech)	Supporting Organization	Academia	Atlanta, Georgia

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Table of Contents

Project Introduction	1
Anticipated Benefits	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Project Website:	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destination	3

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Primary U.S. Work Locations	
Georgia	Texas

Project Transitions

October 2013: Project Start

April 2016: Closed out

Closeout Summary: Software posted as NASA open-source

Project Website:

https://www.nasa.gov/directorates/spacetech/home/index.html

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Small Spacecraft Technology

Project Management

Program Director:

Christopher E Baker

Program Manager:

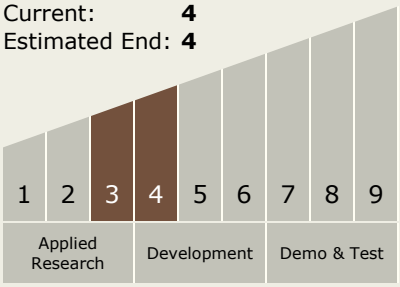
Roger Hunter

Principal Investigator:

Glenn Lightsey

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Other/Cross-cutting:

- TX04 Robotic Systems
  - TX04.5 Autonomous Rendezvous and Docking
    - TX04.5.2 Rendezvous & Docking Algorithms

Target Destination

Earth